AMENDMENTS TO THE CLAIMS

Please amend the claims as indicated in the following listing of all claims:

1. (Currently amended) A method of selecting points for inclusion in a multipoint constellation, the method comprising:

grouping phase intervals into groups based on similarity of aggregate impairment exhibited therein and calculating a characteristic set of symbol estimates for each such group; and

assigning constellation points for a constellation index based on one or more characteristic sets corresponding thereto, wherein the one or more characteristic sets include contributions of symbol estimates from phase intervals associated with one or more other constellation indices.

2. (Original) A method, as recited in claim 1, further comprising:

performing the assigning collectively for each of J distinct constellation indices, wherein the assigning includes:

selecting, for each such constellation index, successive candidate next constellation points that, based on symbol estimates for the one or more characteristic sets corresponding to the constellation index, satisfy a distance metric with respect to a last assigned constellation point for the constellation index; and

assigning successive lowest power ones of the candidate next constellation points to respective constellations.

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3. (Original) A method, as recited in claim 1,

wherein each phase interval corresponding to the constellation index is a member of a same group; and

wherein the assigning includes selecting a next constellation point such that a distance metric between a group-characteristic estimate thereof and a last selected constellation point for the constellation index satisfies a minimum distance criterion.

4. (Original) A method, as recited in claim 1,

wherein at least two phase intervals corresponding to the constellation index are members of different groups; and

wherein the assigning includes selecting a next constellation point such that a distance metric between group-characteristic estimates thereof and a last selected constellation point for the constellation index satisfies a minimum distance criterion for the at least two phase intervals.

5. (Original) A method, as recited in claim 1,

wherein the constellation index is a k^{th} one of six constellation indices; and

wherein a k^{th} one of the phase intervals, a $(k+6)^{th}$ one of the phase intervals, a $(k+12)^{th}$ one of the phase intervals and a $(k+18)^{th}$ one of the phase intervals each correspond to the constellation index.

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6. (Original) A method, as recited in claim 1,

wherein multiple phase intervals correspond to each constellation index.

7. (Original) A method, as recited in claim 1,

wherein a single phase interval corresponds to each constellation index.

8. (Original) A method, as recited in claim 1,

wherein the phase intervals number twenty-four; and

wherein the constellation index is one of six constellation indices.

9. (Original) A method, as recited in claim 1, further comprising:

performing the grouping based on a received impairment compensation sequence that places at least one instance of each symbol from a predetermined set of symbols in each of the phase intervals.

10. (Original) A method, as recited in claim 1, further comprising:

communicating the constellation points to a remote communications device.

11. (Original) A method, as recited in claim 1,
wherein the symbol estimates include amplitude estimates of Ucodes.

12. (Original) A method, as recited in claim 1,
wherein the distance metric includes a set difference measure based on respective amplitude estimates corresponding to representation Uchords.

13. (Original) In a communications system for communicating via a channel susceptible to one or more potential impairments each periodic in an integer N samples of a received signal, a method for mapping constellation points to one or more constellations, the method comprising:
receiving a sequence of symbol estimates organized into N phases, a respective one or more of the phases corresponding to each of J constellation indices;
grouping the N phases into a set of characteristic groups according to aggregate effects of the periodic impairments, if any, present in the N phases and without a priori identification of individual forms of the periodic impairments present therein; and
for each of the J constellation indices, selecting constellation points based on the characteristic groups associated with the one or more respective phases.

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14. (Original) A method, as recited in claim 13, wherein the selecting includes,
for each of the constellation indices, selecting successive candidate next constellation points that, based on the characteristic groups associated with the one or more respective phases, satisfy a distance metric with respect to a last assigned constellation point for the constellation index; and
assigning successive lowest power ones of the candidate next constellation points to respective constellations.

15. (Original) A method, as recited in claim 13, wherein the constellation point selecting for a particular constellation includes:
calculating, for each associated characteristic group, a distance metric between a constellation point last added to the particular constellation and an estimate of a next lowest power constellation point; and

selecting for addition to the particular constellation, one of the next lowest power constellation points for which the calculated distance metric exceeds a minimum distance metric for each associated characteristic group.

16. (Original) A method, as recited in claim 13, wherein the constellation point selecting for a particular constellation includes:

for each associated one of the characteristic groups, finding a next lowest power constellation point for which a distance metric between an estimate of the next lowest power constellation point and a constellation point last added to the particular constellation exceeds a minimum distance metric; and

adding to the particular constellation, a highest power one of the next lowest power constellation points.

17. (Original) A method, as recited in claim 13,

wherein each phase corresponding a j^{th} constellation index is associated with a single characteristic group; and

wherein the constellation point selecting for a particular constellation corresponding to the j^{th} constellation index includes selecting for addition to the particular constellation, a next lowest power constellation point for which a distance metric between a constellation point last added to the particular constellation and an estimate of the next lowest power constellation point exceeds a minimum distance metric.

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18. (Original) A method, as recited in claim 13,

wherein N is 24.

19. (Original) A method, as recited in claim 13,

wherein J is 6.

20. (Original) A communication device for communicating, using one or more constellations, via a channel susceptible to one or more potential impairments each periodic in an integer N samples of a received signal, the communications device comprising:

a receive path for receiving from the channel a sequence of symbols organized into N phases intervals, wherein respective ones of the phase intervals correspond to constellation indices; and

an impairment compensator coupled into the receive path during a training mode to receive the sequence and group the N phases thereof into a set of characteristic groups according to aggregate effects of the periodic impairments, if any,

the impairment compensator selecting, for each of J constellation indices, constellation points based on the characteristic groups associated with the respective phase intervals corresponding thereto.

21. (Original) The communication device of claim 20

wherein the characteristic groups associated with respective phase intervals corresponding to a particular constellation index include contributions of symbol receptions in grouped phase intervals corresponding to other constellation indices; such that selection of constellation points for the particular constellation index is improved by symbol receptions from substantially all phase intervals exhibiting similar aggregate effects of the periodic impairments.

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22. (Original) The communication device of claim 20, further comprising:

a transmit path,

wherein the impairment compensator is coupled to the transmit path to supply an encoding of the selected constellation points to a remote communications device.

23. (Original) The communication device of claim 20, for a particular received sequence,

respective phase intervals corresponding to two or more indistinct ones of the constellation indices are identically grouped; and

distinct ones of the constellation indices number J.

24. (Original) The communication device of claim 20,

wherein N is 24 and J is 6.

25. (Original) An apparatus comprising:

means for organizing a received sequence of symbol estimates into N phases;

means for grouping the N phases into a set of characteristic groups according to correspondence of aggregate effects of periodic impairments, if any, present in the N phases; and

means for selecting constellation points using symbol estimates characteristic of the grouped phases.

26. (Original) The apparatus of claim 25 wherein the means for selecting constellation points using symbol estimates characteristic of the grouped phases includes:

means for selecting candidate next constellation points for each of J distinct constellation indices; and

means for assigning successive lowest power ones of the candidate next constellation points to respective constellations.

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27. (Original) A computer program product comprising:

instructions executable on at least one processor to at least partially implement a communications device; and

said instructions including an impairment compensation subset thereof executable to group N phases of a symbol sequence received by the communications device into a set of characteristic groups according to correspondence of aggregate effects of periodic impairments, if any, present in the N phases, the impairment compensation subset of instructions selecting constellation points using symbol estimates characteristic of the grouped phases.

28. (Original) A computer program product as in claim 27 wherein the instructions are encoded by or transmitted in at least one computer readable medium selected from the set of a disk, tape or other magnetic, optical, or electronic storage medium and a network, wireline, wireless or other communications medium.